

REMARKS

The application has been amended to overcome the Examiner's various objections and rejections.

Amended Claims 18-23 and 25-28 are presented for further consideration.

The chemical formula $A_{2-x}A^1_xB_{1-y}B^1_yO_4$ is now defined in claims 18, 23, and 27. Also, a definition of the formula has been inserted into the claims. This is based on the disclosure on page 6, lines 3 to 10. Claim 19 now provides a positive recitation of an exhaust system of an internal combustion engine.

Claim 24 has been cancelled.

In essence, the Examiner's position appears to be that the claims lack inventive step and that the claims are unpatentable under 35 U.S.C. 103 in view of Palekar *et al.* (U.S. 6,475,350) combined with either Tang *et al.* (U.S. 5,242,881) or Golden (U.S. 5,939,354).

Applicant respectfully submits that combining the disclosure of Palekar *et al.* with that of Tang *et al.* or Golden would not lead to the presently claimed invention.

The secondary citation to Tang *et al.* discloses the use of perovskite type oxides as combustion catalysts. The patent discloses that the perovskites are to be used as catalysts in the fluid catalytic cracking process that takes place in the refining of petrol and refers to them as combustion catalysts. In particular, they are used in the combustion of carbon monoxide. There is no disclosure in the patent that the perovskites are of use in the reaction of nitrogen oxides to form nitrogen as required in the present invention.

Thus, one would only consider combining a perovskite as disclosed in Tang *et al.* with the reactor described in Palekar *et al.* if one wished to use the reactor for the combustion of carbon monoxide. This would therefore lead away from the

present invention where the reactor is used to react carbonaceous combustion products and nitrogen oxides.

Further, even if one were to incorporate a perovskite as disclosed in Tang et al. into a reactor as disclosed in Palekar, this would not result in a reactor as claimed because the perovskites disclosed in Tang et al. do not fall within the definition of perovskites required by the amended claims. The perovskites disclosed in Tang et al. have the formula $A_{1-x}A'_xB_{1-z}B'_zO_3$ where A is La, Ce or rare mixed earth metals, A' is Ca, Sr or Ba, and B and B' are transition metal elements such as Ti, Cr Co, Mn, Cu, Fe or Ni. Thus, although the metals present in these perovskites may be the same as those in the perovskites of the present invention, the perovskites disclosed in Tang et al. do not contain enough oxygen compared with those of the present invention.

Further, the patent to Golden discloses perovskite type catalysts and the fact that they may be used in carbon monoxide oxidation, hydrocarbon oxidation, nitrogen oxide reduction and the oxidation of soot particles. However, the patent is entirely concerned with the catalysts and their preparation and makes no disclosure that these perovskites could be used in the presence of a plasma, in the manner required by the present claims.

Thus, when faced with the disclosure of Golden, one skilled in the art would have to decide to use the perovskites disclosed in Golden in the plasma context of Palekar et al. However, even if one skilled in the art were to make that change to the invention of Palekar et al., it would not result in the present invention. The reason for this is that the perovskites disclosed in Golden also differ from those used in the present invention.

The perovskites used in Golden have the formula $A_{a-x}B_xMO_b$ where b may be 3 or 4. Thus, where b is 4, the perovskite may contain a suitable proportion of oxygen compared to the

perovskites required by the present invention. However, the definitions of A, B and M are such that the perovskites disclosed in Golden do not fall within the definition of the present invention. The reason for this is that, for example, A is a mixture of elements derived from Bastnasite and contains a mixture of lanthanides. In the present invention, the only lanthanide that may be present in the perovskites is La, but a mixture of lanthanides, as required by Golden does not fall within the present invention. Further, the presence of a mixture of lanthanides is a key feature of the perovskites disclosed in Golden as the mixture results from the use of Bastnasite as the source of the lanthanides. Bastnasite constitutes a economical source of the lanthanides and this is regarded as an advantage of the invention disclosed in Golden. It would therefore be wholly against the teaching of Golden to change the source of lanthanides for the perovskites.

It therefore seems that the present invention as claimed in claims 18-21, 23 and 25 to 28 is inventive with respect to the combination of Palekar *et al.* with either or both Tang *et al.* and/or Golden.

The Examiner has also rejected claim 22 based on the combination of Palekar *et al.*, Tang *et al.* or Golden and in further view of Barlow *et al.* (US 5,914,015). Claim 22 depends on claim 21, which possesses an inventive step for the reasons given above; therefore, it is submitted that claim 22 also possesses an inventive step by virtue of its dependence on allowable claim 21.

In addition, the Examiner's construction of Barlow *et al.* as disclosing the feature required by claim 22 is believed to be in error. Barlow *et al.* discloses in Figure 3 a plasma apparatus where exhaust gas passes sequentially through two packed beds in each of which plasma is generated. Claim 22 requires that plasma is generated "separate from and preceding the bed of mixed metal oxide active material." In addition,

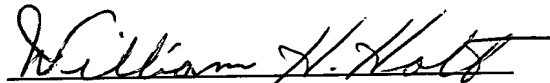
and more particularly, claim 22 is inventive by virtue of its dependence on allowable claim 21 for the reasons set forth above.

In view of the foregoing amendments and remarks, reconsideration is requested and allowance of the claims is courteously solicited.

The Examiner is invited to telephone the undersigned in the event that any changes need to be considered in order to place the application in condition for allowance.

The Commissioner is hereby authorized to charge any required fees associated with this communication and during the pendency of the application under 37 CFR 1.16 and 37 CFR 1.17 or to credit any overpayment to Deposit Account No. 082670. This sheet is submitted in duplicate.

Respectfully submitted,


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October 8, 2003